REMARKS

The Office Action dated September 8, 2003 has been received and carefully noted. By this Amendment, claims 1 and 7 have been further amended to more clearly particularly point out and distinctly claim the invention. No new matter has been added or amendments made that narrow the scope of any elements of any claims. Support for the claim amendments can be found generally in the Specification, as originally filed, at pages 16-25. Accordingly, claims 1-7 are pending in this application and are submitted for consideration.

The Applicant acknowledges and thanks the Examiner for indicating that claims 5 and 6 would be allowable over the prior art if amended to be in independent form. However, Applicant respectfully submits that all of the present pending claims recite allowable subject matter and therefore, placing claims 5 and 6 into independent form is not necessary.

Claims 1-4 and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Dam et al. (U.S. Patent No. 6,385,457, "Dam") and further in view of well known prior art in the field of the invention. In making this rejection, the Office Action took the position that Dam teaches a wireless base station that wirelessly communicates with a plurality of mobile stations using a variety of different signaling techniques, each mobile station sending communication data containing an identifier to the wireless base station.

Independent claim 1 as currently amended recites a wireless base station that wirelessly communicates with a plurality of mobile stations via an antenna by using space division multiplexing (SDM). Each mobile station sends communication data containing an Identifier (ID) to the wireless base station. The wireless base station

includes association information storing means for storing association information that associates each of the plurality of mobile stations with a different ID and receiving means for receiving data into which communication data sent from the plurality of mobile stations is space-division multiplexed. Extracting means are provided for extracting, from the received data, communication data sent from the mobile station, the extraction being performed by (i) specifying an ID associated with each mobile station by referring to the association information, (ii) defining a reference signal containing the specified ID, (iii) obtaining, from first signals that have been sequentially received via an antenna by forming a directivity pattern, a second signal estimated to be related to the communication data, (iv) sequentially performing a calculation based on the second signal and the reference signal, (v) sequentially adjusting the directivity pattern by reflecting a result of the calculation, and (vi) obtaining data based on the second signal.

Independent claim 7 as currently amended recites a wireless phone including receiving means for receiving a word for synchronization sent from a wireless base station and sending means for sending the word for synchronization to the wireless base station. The word for synchronization is sent preceding a main data that is a content of a communication.

In making this rejection, the Office Action took the position that Dam discloses all of the elements of the claimed invention. However, it is respectfully submitted that the prior art fails to disclose or suggest the structure of the claimed invention, and therefore, fails to provide the advantages of the present invention. For example, the Wireless base station of the present invention is configured to extract (extracting means for extracting), from the received data, communication data sent from the mobile station,

the extraction being performed by (i) specifying an ID associated with each mobile station by referring to the association information, (ii) defining a reference signal containing the specified ID, (iii) obtaining, from first signals that have been sequentially received via an antenna by forming a directivity pattern, a second signal estimated to be related to the communication data, (iv) sequentially performing a circulation based on the second signal and the reference signal, (v) sequentially adjusting the directivity pattern by reflecting a result of the calculation, and (vi) obtaining data based on the second signal.

With this arrangement, the plurality of mobile stations each send communication data containing a different unique word to the mobile station. Each unique word is used as a part of a reference signal, which is used to correctly separate and extract communication data which has been sent from a desired mobile station and multiplexed into a received signal, according to the MMSE method or the like. In accordance with results of the extraction, the base station can suitably direct the directivity pattern in a direction of each mobile station. Thus, the base station can communicate with each mobile station using the SDM while reducing interference and maintaining good communication quality.

As shown in Fig. 1, Dam includes at least one mobile switching center (MSC) connected to a plurality base station controllers BSC1-BSC2. A plurality of radio base stations BTS1-BTS6 are connected to base station controllers BSC1-BSC2. A radio frequency channel is divided into a number of time slots characteristic of a TDMA system. A physical radio channel is comprised of a radio frequency channel and one of the eight time slots that constitutes a TDMA frame, which is repeated cyclically in time.

The physical channel consists of an up link connection and a down link connection with a fixed frequency reuse factor therebetween. The physical radio channel transmits logical channels. The logical channels transmit different types of information and are divided into groups of channels depending on the information transmitted.

Radio base station BTS1-BTS6 has at least one frequency channel allocated for radio communication. This allocated frequency channel is a beacon channel. The remaining frequency channels in the radio base station BTS1-BTS6 solely carry dedicated physical channels. Data received by the radio base station BTS1 from the base station controller 1 and forwarded to the mobile station MS1 is processed so as to enable the original data to be estimated in the mobile MS1. The interface between mobile station MS1-MS3 in the radio base station BTS1-BTS6 and the interface A" of the fixed connection between a radio station BTS1-BTS6 and a base station controller BSC1-BSC2 are designated the Abis interface.

As illustrated in step A1 of Fig. 4a of the reference, the radio base station BTS1 receives an access request from mobile station MS1. The access request is received in the access channel in a certain TDMA frame. As shown in step A2, radio based station BTS1 decodes the random number, which becomes a first recognition character for the mobile station MS1. Base station BTS1 identifies the mobile station MS1 as the mobile station from which the access message was received. A directional estimate based on the access request received from the mobile station MS1 is generated in step A3. As shown in step A4, a new data-record is opened in a register for the mobile station MS1. The data-record includes a plurality of information fields. The directional estimate is written into one of these fields and the random number and the TDMA frame number is

written into another field. In Step A5, a response to the access request is identified. The response indicates to the mobile station MS1 the new channel to be used for the radio connection.

The radio base station BTS1 decodes the random number and the new radio channel and the TDMA frame number to which the response relates at step A6. The new radio channel is a logical SDCCH channel. A coded channel number forms a further recognition character for the mobile station MS1. This recognition character is registered in an information field intended for new channel numbers in the data-record that has been set up. In step A7, the correct data-record is found by referring to the random number in the frame number, which accompanies the response to the access request. Communication takes place over the SDCCH channel where signal data for setting up a traffic connection is exchanged between the mobile station MS1 and the base station controller BS1, as shown in step A8. A directional estimate is also generated on the basis of the latest received signal sequence as shown in step A9. The latest received directional estimate is registered in the data-record set up in the register.

The correct data-record is found by referring to the channel number in step A10. Next, it is determined whether a channel allocation message has been sent in the downlink is illustrated in step A11. If the answer is negative regarding no channel allocation message being sent, the communication continues over the channel in accordance with step A8. A new directional estimate is generated on the basis of the latest received signal burst, as shown in step A9. If the answer to the inquiry is yes, meaning a channel allocation message has been sent to the downlink, the new channel number is decoded in accordance with step A12 as shown in Fig. 4b. The decoded

channel number is registered in the information field for a new channel number and the data-record that has been set up, as shown in step A13. The allocated physical traffic channel is carried by a frequency channel different to the beacon channel and is handled by another transceiver unit. The directional estimate is read out from the data-record by referring to the new channel number, as shown in step A14.

By the above amendments, it has been clarified that the extracting means according to claim 1 of the present invention uses the reference signal containing the ID as information for sequentially performing a calculation in order to adjust the directivity pattern. In the present invention, the ID is used to adjust the directivity pattern. In sum, the present invention provides a technique for adjusting, when the direction of the mobile station is not determined yet, the directivity pattern corresponding to a first calculated direction by sequentially identifying the second signal that is sequentially received and the reference signal.

On the other hand, for the terminal recognition character in Dam, a direction has already been calculated and a terminal recognition character is recorded in a list so as to be utilized in calculating the direction for a specific terminal, and the terminal recognition character being used for a look-up. Thus, the use of the ID of the present invention is different from the use of the terminal recognition character in Dam.

In Dam, a direction of a mobile station with which a communication has been performed via a specific channel is calculated and recorded in a list along with a terminal recognition character of the mobile station. When the communication is switched to a new channel, the recorded direction of the mobile station is read from the list to be used in forming a directivity pattern after connecting via a new channel. With

this technique, a direction that has already been calculated is reference/reused when connecting via a different channel.

However, in the present invention, plural mobile stations, each of which performs a private communication at the same time by using space division multiplexing, transmit pieces of communication data each containing a different ID for each mobile station, as in claim 1. For example, the wireless base station of the present invention obtains a signal for one mobile station (second signal) from received signals (first signals), adjusts the directivity pattern through a process of identifying the second signal and the reference signal containing the ID, and extracts the communication data from the mobile station based on the result of adjusting.

The Office Action admitted that Dam does not explicitly disclose that space division multiplexing (SDM) is a method used for communication between the base station and the mobile terminal. The Office Action further took the position that Dam teaches that TDMA, FDMA, or any other system where the frequency spectrum is divided. Official Notice was taken stating that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Dam's method in order to be used in various communications systems, including SDM.

However, according to MPEP § 2144.03, although the rationale supporting an obvious rejection may be based on common knowledge in the art, in that the Examiner may take Official Notice of facts outside of the record, which are capable of instant and unquestionable demonstration of being "well-known," no reference or authority was cited in support of the Examiner's position. Accordingly, Applicant challenges this assertion.

With respect to amended claim 7 of the present invention, upon receiving a link channel assignment request from the wireless phone, a wireless base station sends, to the wireless phone, a word for synchronization that is different for each wireless phone. Then the wireless phone sends the word for synchronization before sending a main body of the data that is the content of a communication. As a result, the wireless base station of the present invention is able to adjust a directivity pattern by receiving a different word for synchronization for each wireless phone. Thus, it is possible that the wireless base station adequately receives the main body of the data using the adjusted directivity pattern. This is neither disclosed or suggested in Dam.

Furthermore, with respect to claims 2-4, although the Office Action took the position that Dam discloses all the elements of claims 2-4, it is respectfully submitted that Dam also fails to disclose or suggest all of the elements of these claims.

For example, Dam fails to disclose that the association information includes a plurality of IDs and state information, as recited in claim 2, or that the wireless base station further comprises requests receiving means, or association deleting means, as recited in claim 3.

Therefore, as discussed above, Applicant submits that the prior art either alone or in combination, fails to disclose or suggest the claimed invention.

Thus, it is respectfully submitted that the Applicant's invention, as set forth in claims 1 and 7 is not obvious within the meaning of 35 U.S.C. § 103.

Still further, because claims 2- 4 are dependent on claim 1, Applicant submits that these claims recite subject matter that is neither disclosed nor suggested by the cited prior art for at least the reasons set forth above with respect to claim 1.

In view of the foregoing, reconsideration of the application, withdrawal of the outstanding rejections, allowance of claims 1-4 and 7 (claims 5 and 6 already being indicated as reciting allowable subject matter), and the prompt issuance of a Notice of Allowability are respectfully solicited.

If this application is not now in condition for allowance, the Examiner is requested to contact the undersigned at the telephone listed below.

In the event this paper is not considered to be timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, **referencing docket number 101201-00014.**

Respectfully submitted,

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Enclosures: Petition for Extension of Time (two (2) months)